

# ARIUS GRAEFFEI AND ARIUS ARMIGER: VALID NAMES FOR TWO COMMON SPECIES OF AUSTRALO-PAPUAN FORK-TAILED CATFISHES (PISCES, ARIIDAE)

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## Summary

KAILOLA, PATRICIA J. (1983) *Arius graeffei* and *Arius armiger*: valid names for two common Australo-Papuan fork-tailed catfishes (Pisces, Ariidae). *Trans. R. Soc. S. Aust.* **107**(3), 187-196, 30 November, 1983.

*Arius graeffei* Kner & Steindachner 1866 is a senior synonym of *Arius australis* Günther 1867 and *Arius armiger* De Vis 1884 is a senior synonym of *Arius stirlingi* Ogilby 1898. Diagnostic descriptions and distributions of *A. graeffei* and *A. armiger* are presented. Taylor's (1964) conclusions that *A. australis*, *A. stirlingi* and *A. leptaspis* represent one species are not supported.

KEY WORDS: Northern Australia, Papua, fork-tailed catfishes, Ariidae.

## Introduction

Although fork-tailed catfishes are abundant in the rivers, estuaries and muddy coastal waters of northern Australia and New Guinea, the taxonomy of this fauna is poorly understood. The need for a serious study of the family is reflected in the history of the species listings for Australia: only 8 species are common to the listings of McCulloch (1929—total of 12 species), Munro (1957—11 species) and Whitley (1964—13 species).

My studies over the past few years have revealed the existence of eighteen valid species in Australia: six of them are undescribed, and the nomenclature of the described species is confused. The present paper seeks to unravel the confusion surrounding two common species and to redefine those species by a new combination of characters.

In his study of the fishes of Arnhem Land, Taylor (1964) suggested that *Arius australis* Günther 1867, *A. leptaspis* (Bleeker 1862) and *A. stirlingi* Ogilby 1898 may represent only population divergence within one species. Lake & Midgley (1970), Lake (1971) and Pollard (1974, 1980) followed Taylor and considered *A. leptaspis* (Bleeker) a single widely-dispersed Australo-papuan catfish (although Lake cautions that a detailed study of large numbers of varying sizes of catfish over the whole range of their distribution is needed to settle the matter).

## Materials and Methods

In this study, I have endeavoured to examine specimens from the recorded range of each species.

The specimens reported here are located in the following collections: American Museum of Natural History (AMNH); Australian Museum, Sydney (AMS); British Museum (Natural History) (BMNH); CSIRO Division of Fisheries (CSIRO); Macleay Museum, University of Sydney (MMUS); Museum National d'Histoire Naturelle, Paris (MNHN); Naturhistorisches Museum, Vienna (NMW); Queensland Museum (QM); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); South Australian Museum (SAM); Western Australian Museum (WAM).

Measurements were made from the left side of the body with needle-point calipers to the nearest 0.1 mm, but in the case of very large fishes, standard lengths (SL) were obtained by use of a mm-graduated ruler. The methods of measurement and counting follow Hubbs and Lagler (1958) with the following additions: width of the maxillary tooth band—broadest width measured across curve of the tooth band; length of the maxillary tooth band—longest distance of band, usually across each lateral arm; "interdorsal" fin space—distance between insertion point of last dorsal fin ray and anterior of the adipose fin; length of occipital process—from base of the bone where it meets the dorsomedian head groove to its most posterior point where it meets the predorsal plate; breadth of occipital process—widest distance at base of the process where it meets the main body of the head shield;

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maxillary barbel length—distance from insertion point of the barbel to its tip; free vertebral count—total number of vertebrae from the first unfused vertebra behind the Weberian Apparatus to the last vertebra at the tail base (urostyle included); made from x-rays.

Counts, using a needle probe, were made of the dorsal, anal and pectoral fin elements and of the gill rakers.

### Results

I find that *A. graeffei*, *A. leptaspis* and *A. armiger* are all valid species. Furthermore, the names *Arius australis* Günther 1867 and *A. curtisii* Castelnau 1878 are junior subjective synonyms of *A. graeffei* Kner & Steindachner 1866; the name *Arius stirlingi* Ogilby 1898 is a junior subjective synonym of *A. armiger* De Vis 1884.

Taylor (1964) identified 12 ariid specimens from Oenpelli as *A. australis*, one from Roper River and 14 from East Alligator River as *A. leptaspis*. He lacked *A. stirlingi* specimens. From information I supplied on distinguishing characters, Janet Gomon (U.S. National Museum) examined Taylor's specimens and reported that the 12 Oenpelli specimens identified as *A. australis* are *A. leptaspis* Bleeker, and that the Roper River and East Alligator River specimens identified as *A. leptaspis* are an undescribed *Arius* (*Arius* sp. 1) found in freshwater from the Roper River westward to the Ord River (W.A.). Taylor's figures (pp. 74, 80, 82) and species analysis are therefore not of *A. australis* (= *graeffei*) (see Table 1 and Figure 2 for comparison). What Lake, Midgley and Pollard have called *A. leptaspis* therefore, could have been either *A. graeffei*, *A. leptaspis*, *Arius* sp. 1 or *A. armiger*. Pollard has reproduced Taylor's figure of *A. leptaspis* (1980: 89). Grant (1978) consistently followed Munro (1957) and used *Neosaurus australis*.

*Arius graeffei* Kner & Steindachner 1866

FIGS 1, 2; Tables 1, 2.

*Arius graeffei* Kner & Steindachner 1866: 383, fig. 12 (Samoa—locality doubtful, probably northern Australia).

*Arius australis* Günther 1867: 103, fig. (Ash Island, Hunter River, N.S.W.).

*Arius curtisii* Castelnau 1878: 236 (Moreton Bay, Queensland).

**Material examined:** Holotype of *A. graeffei*: NMW 67 152, unknown locality, 252 mm SL; two syntypes of *A. australis*: BMNH 1866.2.13.4, Ash Island, Hunter R., N.S.W., no date, Scott,

275 mm SL and BMNH 1866.6.19.7, same data, 380 mm SL, syntype of *A. curtisii*: MNHN B.693, Moreton Bay, Qld, no date, Curtis, 144 mm SL; and 46 additional specimens from the following locations: N.S.W.: 6, Clarence R., 292–336 mm SL; 3, MMUS F.154, Richmond R., 197–207 mm SL; Qld: 4, QM 1.12001, 1.430, 1.9835, 1.9836, Brisbane R., 177–273 mm SL; 2, QM 1.16734, 1.16740, Boyne R., 117 and 297 mm SL; 1, QM 1.8606, Dawson R., 171 mm SL; 1, Chapman R., 236 mm SL; 1, QM 1.12758, Flinders R. near Maxwellton, 340 mm SL; N.T.: 6, Jabiru & Long Harry's Billabong, 178–323 mm SL; 3, Daly R., 83–310 mm SL; W.A.: 1, SAM F.4242, Ord R., 93 mm SL; 3, AMNH unreg., King R., 74–118 mm SL; 1, WAM P.25597–002, Fitzroy R., 329 mm SL; 3, AMNH unreg., Yeeda Creek, 88–113 mm SL; 1, WAM P.22876–001, Dampier, 358 mm SL; 4, AMS 1.18217–006, Maitland R., 77–88 mm SL; 1, WAM P.5807–001, Fortescue R., 376 mm SL; 2, AMNH unreg., Ashburton R., 85 and 292 mm SL; New Guinea: 1, Ihu, Gulf of Papua, 289 mm SL; 2, RMNH unreg., Jamber Lake, 261 and 333 mm SL.

**Definition:** the combination of: raker-like processes present on the back of all gill arches; palatal teeth villiform and in transverse series of four oval patches, palatine patches larger than vomerine patches; maxillary barbels never reaching further than opposite base of dorsal fin spine; free vertebrae 45–48.

**Description** (based on 50 specimens): D.1.7, A. 15–19 (mean 17.4); P.1.10–11; GR (first arch) 17–22, mean 19 (total) of which 6–8 on upper limb; GR (last arch) 16–22, mean 19.1 (total); C. primary rays 7 + 8; V.6; number of free vertebrae 45–48.

Body robust, elongate (Fig. 1, Table 1, 2); anterior profile straight, moderately steep, elevated slightly before dorsal fin; mouth moderately broad and slightly curved, its width 2.1–2.7 (mean 2.4) in head length; snout sharply rounded, moderately fleshy upper lip extending beyond mouth gape, teeth usually concealed when mouth closed; shallow groove may be present on snout between nostrils; hind nostrils ovate-elliptical, anterior flap just concealing opening; eye ovate, dorso-lateral, free of orbit and positioned 1–1½ air eye diameter before mid-length of head. Jaw teeth in arched curved bands, villiform: fine and sharp, depressible and in many (6–9) irregular series; length of maxillary tooth band 5.2–9.2 (mean 7.1) in its breadth; edentulous space separates each side of mandibular tooth band. Four patches of small, fine, sharp teeth on palate arranged transversely: vomerine patches ovate or rounded, separated at midline, noticeably smaller than outer oval palatine patches; with age vomerine and palatine patches often fuse

into one unit on one or both sides of palate or all four may coalesce to form single broad patch; two narrow smooth-edged longitudinal skin flaps well back on smooth palate.

Head shield (Fig. 2) finely and somewhat sharply granulated, granules arranged in series along each side of dorsomedian head groove, radiating outwards and over occipital process

TABLE 1. *Relative body proportions of Arius graeffei and Arius stirlingi.*

Character	<i>Arius graeffei</i>			Taylor's <i>A. australis</i>	<i>Arius armiger</i>		
	n	range	mean		n	range	mean
head in SL	50	3.0-3.8	3.4	3.0-3.5	30	3.2-4.0	3.5
eye 1. in head 1.	50	3.7-8.4	6.1	7.6-10.1	30	5.9-9.9	7.4
eye 1. in snout 1.	50	1.4-3.2	2.3		30	1.9-3.6	2.7
eye in bony inter-orbital width	48	1.1-3.0	2.1		28	1.6-3.3	2.3
occip. process width							
in process length	41	1.0-2.1	1.4		27	1.1-1.9	1.5
D. spine in hd. 1.	47	1.0-2.2	1.6	2.0-2.4	25	1.0-1.4	1.2
P. spine in hd. 1.	46	1.0-2.0	1.5	1.9-2.2	26	1.2-1.7	1.4
adipose fin base in D. fin base	50	1.0-2.0	1.3		30	0.8-1.9	1.2
adipose fin base in interdorsal space	50	2.4-5.9	3.4	2.6-3.3	30	2.0-5.1	3.0
caudal peduncle depth in its length	50	1.6-2.6	2.0		29	1.5-2.4	1.9
predorsal in SL	50	2.4-2.8	2.6	2.5-2.7	30	2.6-3.0	2.8
interdorsal in SL	50	3.1-4.1	3.6	3.3-4.2	30	3.3-4.3	3.8
longest barbel in SL	50	2.5-5.8	3.8		30	1.8-3.3	2.5
head height in head width	48	1.1-1.7	1.4		30	1.1-1.5	1.3
length mx tooth band in its width	35	5.2-9.2	7.1		26	4.3-10.6	8.3
eye in SL	50	13.7-26.6	20.2		30	20.1-33.3	26.2
mouth width in head 1.	27	2.1-2.7	2.4		15	2.0-2.3	2.1
bony interorb. width in head length	48	2.5-3.5	2.9		28	2.9-3.9	3.2
S.L. (mm)		74.2-380.0		201-435 mm		74.0-285.0	

TABLE 2. *Percentage of standard length (SL) for specimens of Arius graeffei and A. armiger.*

Character	<i>A. graeffei</i>			<i>A. australis</i>	<i>A. curtisi</i>	<i>A. armiger</i>	<i>A. armiger</i>	
	n	holotype	syntypes			n	syntypes	
SL range (mm)		74-376	252	275	380	144	74-285	134 148
head length	46	26-34	32	29	32	30	25-31	27 28
eye diameter	46	4-7	5	4	4	6	3-5	4 4
P fin spine 1.	42	15-23	20	19	19	22	17-23	— 23
D fin spine 1.	43	14-24	17	17	17	20	20-32	— —
adipose fin base 1.	46	5-11	8	8	6	10	8-13	8 6
anal fin base 1.	46	11-16	12	13	14	13	18-22	20 20
dorsal fin base 1.	46	9-13	10	10	12	12	10-13	11 11
interdorsal space	46	24-32	31	27	33	27	24-30	27 30
predorsal 1.	46	35-41	39	37	39	39	34-39	35 37
longest barbel	46	17-39	23	24	23	26	27-56	50 41
length occipital process	37	7-11	8	8	8	9	7-10	8 8
bony interorbital space	44	8-13	11	10	11	11	7-10	9 10
caudal peduncle depth	46	6-9	7	8	8	7	8-9	8 7
caudal peduncle length	46	13-18	15	15	14	15	13-19	17 16
snout 1.	46	9-13	13	10	13	11	8-12	9 10
head height	45	14-19	14	16	19	16	14-20	15 14
head width	45	19-28	22	22	25	22	19-23	21 20
internostril distance	25	7-12	9	9	10	8	6-15	— —
L. longest anal fin ray	40	12-28	17	12	17	12	13-19	16 14

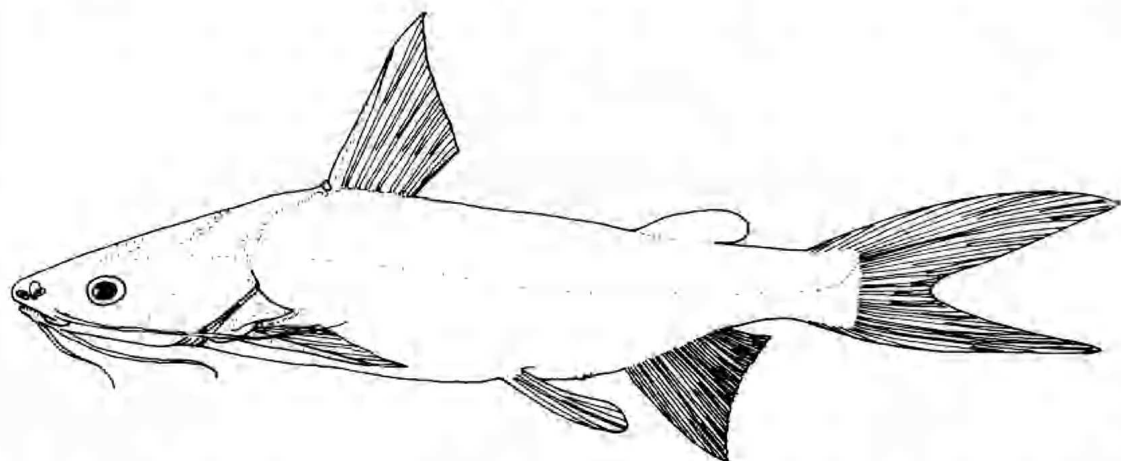


Fig. 1. Lateral view of *Arius graeffei*, 193 mm SL. AMNH field no. DR1969-94, 95; Hann R., W.A.

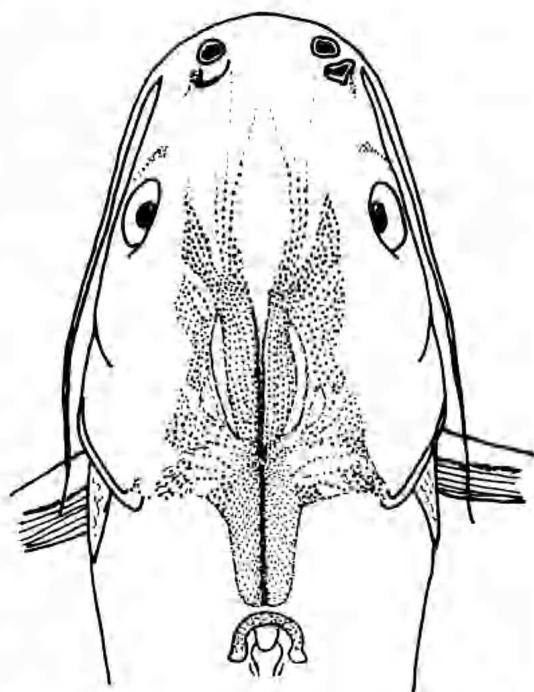


Fig. 2. Head view from above of *Arius graeffei*, 228 mm SL. SAM 4693, Clarence R., N.S.W.

from end of groove and laterally on head shield radiating from centres of small groups; interorbital flat, granulated head shield beginning above middle of eye; dorsomedian head groove narrow, straight-sided and moderately deep, originating above or slightly behind posterior margin of eye, terminating at base of occipital process. Sides of head smooth or slightly venulose. Median keel of occipital

process not prominent, process roughly triangular with straight sides, 1.0–2.1 (mean 1.4) longer than wide, its slightly rounded end contiguous with crescentic granular predorsal plate. In many specimens, noticeably those obtained from rivers, thick skin obscures head shield pattern. Humeral process rugose or with granulated striae, triangular and acute, horizontal or slightly oblique, extending one-third of the distance along pectoral fin spine length and ossified anteroventrally. Axillary pore present. Barbels thick, slightly flattened: maxillary barbels longest, extending at least to head edge, usually to above pectoral fin base or midway along fin spine, in juveniles (less than 130 mm SL) ending below dorsal fin spine; mandibular barbels may reach pectoral fin base; mental barbels reach about halfway between eye and pectoral fin base.

Rakers of first gill arch half as long as gill filaments; 12–20 (mean 16.7) short raker-like processes along back of first gill arch, 15–23 (mean 18.7) along back of second gill arch, 15–21 (mean 17.1) along back of third gill arch. Fleshy pad present on back of upper limb of each gill arch, that of second arch best developed.

Spines of dorsal and pectoral fins moderately thick with pattern of longitudinal striae, tips with short filaments; anterior margin of each spine rough with low denticles and 3–6 low antrorse serrae towards tip; posterior margin of dorsal spine smooth but low serrae towards tip in several specimens; posterior margin of pectoral spine dentate with 12–19 regularly-spaced stout sharp serrae. Longest dorsal ray 2.5–3.5 times length of last ray. Adipose dorsal

fin above middle of anal fin, its convex margin smooth; anal fin margin concave posteriorly, longest ray 2.4–3.3 times length of last ray. Ventral fin shape variable: in males, base narrow, fin rays rarely reaching anal fin origin—usually ending well before; in females, base broad, fin rays frequently reaching 4th–6th anal fin ray, inner (5th + 6th) elements of ventral fin becoming thickened and developing a pad or hook with sexual maturity. Caudal fin lobes moderate, pointed upper lobe slightly longer than lower lobe.

Caudal peduncle moderately thick, depth 1.6–2.6 (mean 2) in its length. Lateral line almost straight to tail base where it curves upward.

*Fresh colour* variable: dark brown, deep blue, fawn or dark ochre above (sometimes with iridescence), becoming yellowish, cream or white on undersides, sometimes brown-stippled over belly. Maxillary barbels black or dark brown, chin barbels either dark or pale; specimens from Victoria and Daly Rivers sometimes "piebald"—blotched black and white, black patches even extending into mouth and over fins (e.g. Victoria R. specimen AMS I.20857–001, 305 mm SL). Fins uniform tan or bluish, densely and finely stippled dark fawn to black, undersides of pectoral and ventral fins cream, base of anal fin and last few rays cream. Iris yellow. Peritoneum pale but faintly stippled dusky. In preservative the blue and iridescence are lost.



Fig. 3. The distribution of *Arius graeffei* (based on all material examined).

*Distribution and Habitat* (Fig. 3): Found from the Hunter River (N.S.W.) on the east coast, north and westward (Qld, N.T., W.A.) to as far south on the west coast as the Ashburton River and the Abrolhos Islands (AMS I.7035). Not common in New Guinea (Gulf of Papua coast, south-western New Guinea coast? Jamoer Lake). *Arius graeffei* is generally abundant in coastal draining rivers and streams from above tidal limits to estuaries and adjacent coastal waters.

#### *Arius armiger* De Vis 1884

FIGS 4, 5; Tables 1, 2.

*Arius armiger* De Vis 1884: 454 (New Britain—locality doubtful, probably northern Australia). *Arius stirlingi* Ogilby 1898: 281 (estuary of Adelaide R., N.T.).

*Material examined*: Two syntypes of *A. armiger*: QM I.3089, unknown locality, 134 mm SL and QM I.3088, unknown locality, 148 mm SL; and 28 additional specimens from the following locations: Qld: 1, QM I.867, "Queensland coast", 215 mm SL; 1, AMNH 17717, same data, 178 mm SL; 3, Moonkan R., 259–285 mm SL; 2, QM I.11789, Karumba, 105 and 111 mm SL; 2, CSIRO C.3800 and C.4378, Norman R. at Karumba, 161 and 188 mm SL; 2, QM I.11632, Bynoe R., 79 and 89 mm SL; N.T.: 2, SAM F.1094 and F.1095, Adelaide R., 221 and 280 mm SL; 2, Murgarella Creek, 102 and 111 mm SL; 1, East Alligator R. mouth, 74 mm SL; 1, AMNH unreg., Victoria R., 87 mm SL; W.A.: 5, King R. near Wyndham, 174–265 mm SL; New Guinea: 1, Mojanamu, Papua, 129 mm SL; 1, Kabiri Creek, Papua, 160 mm SL; 2, Baimuru, Papua, 142 and 257 mm SL; 1, CSIRO A.3043, Kerema Bay, Papua, 93 mm SL; 1, Kerema, Papua, 155 mm SL.

*Definition*: distinguished by combination of: absence of raker-like processes from back of first and usually second gill arches; palatal teeth small and sharp and in transverse series of four oval patches; dorsal fin spine noticeably longer than pectoral fin spine; maxillary barbels reaching dorsal fin at least; anal fin with 22–25 elements.

*Description* (based on 30 specimens): D.I.7: A.22–25 (mean 24); P.I.9–10; GR (first arch) 16–22, mean 19 (total) of which 7–8 on upper limb; GR (last arch) 16–22, mean 18.6 (total); C. primary rays 7 + 8; V.6; number of free vertebrae 43–45.

Body slender, elongate (Fig. 4, Table 1, 2): anterior profile straight to occipital process base whence distinctly convex; mouth moderately broad and slightly curved, its width 2–2.3 (mean 2.1) in head length, upper jaw evenly curved, symphysis of lower jaw slightly but distinctly elevated; snout rounded, mode-



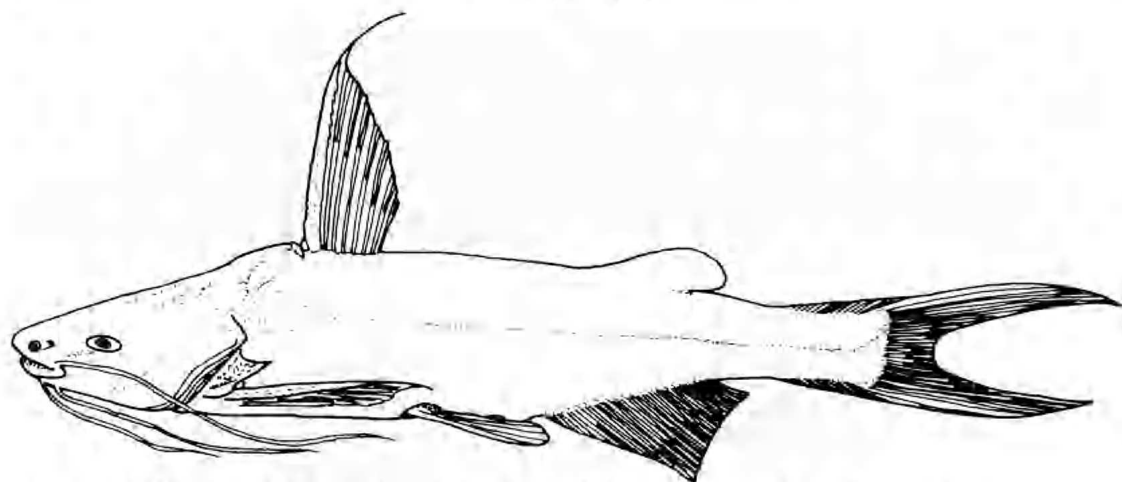


Fig. 4. Lateral view of *Arius armiger*, 161 mm SL. CSIRO C3800; Norman R., Qld.

rately thickened lips extending slightly beyond mouth gape such that  $\frac{1}{2}$ – $\frac{1}{3}$  maxillary tooth band exposed when mouth closed; no (or rarely) shallow groove on snout; hind nostril ovate-elliptical, low frills laterally, anterior flap barely concealing opening; eye ovate-oblong, dorso-lateral, orbit noticeably oblique; eye only free of orbit antero-ventrally and positioned  $1\frac{1}{2}$ – $2$  an eye diameter before mid-length of head.

Jaw teeth in curved bands, villiform; slender and sharp, depressible and in 5–9 series; breadth of maxillary tooth band 4.3–10.6 (mean 8.3) in its length; narrow edentulous space separates each side of mandibular tooth band. Four patches of low, sharp and stout or bluntly-pointed conical teeth on palate arranged transversely; vomerine patches rounded, always well separated at midline; outer palatine patches larger and elongate-oval, contiguous or adjacent to vomerine patches. Short angular skin flap well back on smooth palate.

Head shield (Fig. 5) smooth anteriorly, posteriorly and laterally feebly granulated; striate ridges posteriorly each side of dorso-median head groove; sides of head and snout smooth and venulose; head shield beginning before eye; interorbital flat or slightly concave; dorsomedian head groove narrowly elliptical and moderately deep, originating slightly behind posterior eye margin and terminating at base of occipital process. Finely granulated striae radiate in parallel series over occipital process from its base, median keel sharp and strong, process 1.1–1.9 (mean 1.5) longer than wide, sides slightly concave, hindborder emarginate or indented, contiguous with cres-

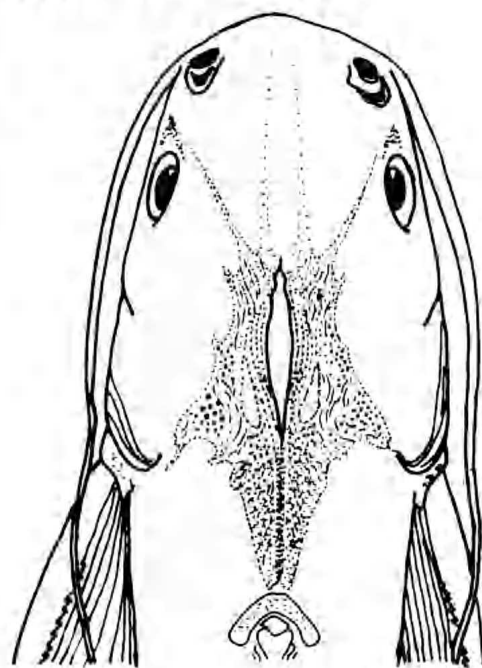


Fig. 5. Head view from above of *Arius armiger*, 188 mm SL. CSIRO C4378; Norman R., Qld.

centic predorsal plate. Humeral process smooth or rugose, triangular and short, lower border concave, heavily ossified antero-ventrally; process horizontal or slightly oblique, extending  $\frac{1}{2}$  distance along pectoral fin spine length. Axillary pore moderately large. Barbels slender, flattened; maxillary barbels longest, always reaching dorsal fin and often as far as ventral fin origin; mandibular barbels reach opposite occipital process or to below mid-dorsal fin; mental barbels usually extend past gill opening to base of pectoral fin.

Rakers of first gill arch two-thirds length of gill filaments; back of first arch smooth; back of second arch often smooth, otherwise with 1-4 small raker-like processes on upper limb; 16-21 (mean 18.6) moderate processes along back of third arch. Thickening of upper limb of each gill arch developed as fleshy pad on second limb. Spines of dorsal and pectoral fins slender, almost smooth, tips with filaments—that of dorsal spine noticeably long; anterior margin of dorsal spine roughened, even granular, of pectoral spine almost smooth; 5-9 low antrorse serrae towards tip of each spine; posterior margin of dorsal spine with 14-19 low sharp serrae, posterior margin of pectoral spine with 17-22 regularly-spaced stout strong serrae. Longest dorsal fin ray 2.9-4.1 times length of last ray. Adipose fin above middle of anal fin, margin smooth, truncate or slightly convex; anal fin margin straight or slightly emarginate posteriorly, longest ray 2.3-3.6 times length of last ray. Ventral fin shape variable: in males, base narrow, fin rays rarely reaching anal fin origin; in females, base broad, fin rays reaching opposite 3rd-8th anal fin ray, inner (5th + 6th) elements becoming thickened and developing a fleshy pad with sexual maturity. Caudal fin lobes slender, tapered, upper lobe slightly longer than lower.

Caudal peduncle compressed, depth 1.5-2.4 (mean 1.9) in its length. Lateral line much branched, especially anteriorly, line almost straight to tail base where it curves upward.

**Fresh colour.** Readily recognisable by its coppery or golden brown or bronze head and upper sides, shading to creamy yellow below. Fins coppery-fawn or dusky yellow, pale orange basally and finely stippled grey, margins and filaments charcoal, undersides of pectoral and ventral fins cream; iris coppery; all barbels dark brown. Peritoneum pale grey or white. Carter (*in litt.* Jan. 1981) noted fresh colouration of three mature female specimens from the Moonkan River as very pale greyish-pink dorsally, creamy below; fins slightly pink and broadly edged black; ventral fins creamy white. In preservative, the pink, orange and sheen are lost.

**Distribution and Habitat** (Fig. 6): In Australia found from Edward River system, Cape York westward along the Gulf of Carpentaria, Northern Territory and as far as the King River (W.A.); in New Guinea from Yule Island to the Digoel (Hardenberg, 1941) and Lorentz (Weber, 1913) Rivers in the west.



Fig. 6. The distribution of *Arius armiger* (based on all material examined and authentic literature records).

*Arius armiger* is abundant in shallow coastal waters and lower estuarine zones, not extending into fresh water.

### Discussion

#### *A. Arius graeffei*

*Arius graeffei* was described in a paper by Kner & Steindachner read before a meeting of the Austrian Academy of Sciences on 5th July 1866 and published that year in the Society's "Sitzungsberichte" (vol. 54). The specimen, from "Samoa Inseln", was subnumbered 2103 in the Godeffroy Museum collection.

On 24th January 1867, Günther read before the Zoological Society of London a paper in which he described *Arius australis* based on three specimens sent to the British Museum by Krefft from Ash Island in the Hunter River, N.S.W. These syntypes are catalogued BMNH 1866.2.13:4 (275 mm SL), 1866.6.19:7 (380 mm SL) and 1866.6.19:8 (300 mm SL).

Günther (1909) presents the figures and an abbreviated description of Kner & Steindachner's *Arius graeffei* from "Samoa". Günther did not view the specimen and perhaps the wide geographical discrepancy of stated type locality led him not to remark how similar was *A. graeffei* to his own species *A. australis*.

In the Australo-papuan region *A. graeffei* was first mentioned by Paradise & Whitley (1927) who stated "the only species of marine catfish met with" in the Sir Edward Pellew Island Group (15°40'S, 136°30'E) was *Arius* (*Tachysurus*) *graeffei* Kner & Steindachner, considered "A new record for Australia" (p. 80). They also (p. 97) suggested that Kner &

Steindachner meant "East Indies" instead of "Samoa" as the type locality.

I have examined a 245 mm SL specimen presented to the Australian Museum by Paradise in 1923 from the Pellew Group (and likely to be the specimen he and Whitley identified as *A. graeffei*). Labelled *Arius* (*Tachysurus*) *graeffei* (AMS 1A.1484) it is actually an example of *Arius proximus* Ogilby 1898.

Paradise & Whitley's record of *A. graeffei* non Kner & Steindachner may have led McCulloch (1929: 59) to include *A. graeffei* Kner & Steindachner in his checklist of Australian fishes, stating "Samoa (locality doubtful). North Australia, Indo-Pacific?". Whitley (1940) realised that the Pellew Island specimen was *A. proximus*, listing it in the synonymy of that species. He also questionably considered *A. proximus* Ogilby a junior synonym of *A. graeffei* Kner & Steindachner. Later however (1941) he listed *A. graeffei*, *A. proximus* and *A. australis* as valid Australian species. Taylor (1964), although apparently unaware of Whitley's 1940 correction, arrived at the same conclusion and questionably referred Paradise & Whitley's *A. graeffei* to *A. proximus* Ogilby, but did not list *A. graeffei* as a valid Australian species.

Kner & Steindachner likened *Arius graeffei* to *Arius gagorides* (Valenciennes, 1840). Fowler (1928: 61) went even further, stating: "in its roughly granular head and spines, and especially the dentition, it approaches *Pimelodus sona* Buchanan-Hamilton" [sic] and immediately placed *A. graeffei* as a junior synonym of *Tachysurus sona* (Buchanan-Hamilton, 1822) [sic, type locality estuaries of Bengal. Weber & de Beaufort (1913) and Chandy (1953) regarded *A. gagorides* questionably valid; Misra (1976) appears to follow Fowler who again (1941) placed as synonyms: *A. sona* (Buchanan-Hamilton, 1822) [sic], *A. gagorides* (Val. 1829) [sic], *A. trachipomus* Val. 1839 and *A. graeffei* Kner & Steindachner. McKay (QM) recently examined the type specimens of *A. gagorides* and *A. trachipomus* on my behalf and found that they are synonyms of *A. sona*, and that *A. graeffei* is a distinctly different species.

Macleay (1881) recorded *Arius gagorides* from Port Darwin, his description mostly copied from Günther (1864). Macleay's specimen became the holotype of *Arius mastersi* Ogilby 1898 (MMUS F.153). Interestingly,

Ogilby (1898a) considered *A. gagorides* and *A. sona* conspecific (i.e. predating Fowler).

In Australian literature, the name *A. graeffei* appears only once more: as *Pararius graeffei* (Whitley, 1964).

Kner & Steindachner's specimen of *A. graeffei* was located in the Naturhistorisches Museum, Vienna (NMW 67 152) and I have compared it with similar-sized specimens of *A. australis* Günther from Australia. The *A. graeffei* holotype is in reasonably good condition, and judged by the length and condition of the ventral fins, is a female.

Ahnelt (NMW) (*in litt.*) says that large sections of the Godeffroy collection were sold last century and further, that it is not uncommon for Godeffroy fishes to have incorrect locality data. Kner & Steindachner (1866) described fishes not included in the earlier works by Grasse on material in the Godeffroy collection. Although most of the collection came from Fiji, Samoa and the Phoenix Islands there is every reason to believe that the 252 mm SL specimen of *A. graeffei* did not, and was one of a miscellaneous group of natural history specimens presented to the Museum by a now untraceable donor. *Arius graeffei* is thus a senior synonym of *A. australis* Günther 1867.

*Arius curtisii* Castelnau 1878 is also a junior synonym of *A. graeffei*. I have examined a syntype (MNHN B.693, 144 mm SL) which is in poor condition. Castelnau stated (1878: 237) "I have several specimens, but all badly preserved; the largest is nearly fifteen inches long, the others are about six inches." The type locality is Moreton Bay. It has not been possible to locate the remaining Castelnau specimens.

#### B. *Arius armiger*

The type locality of *Arius armiger* De Vis 1884 is stated to be New Britain (Bismarck Archipelago, New Guinea). Doubts about the validity of this type locality arose because: (1) *Arius armiger* has remained (until now) known only from the types; (2) there are no subsequent records of catfishes from New Britain despite extensive fishery surveys around the island during the past 12 years by the Papua New Guinea Fisheries Research & Survey Division; (3) New Britain, a mainly mountainous island, has short, fast-flowing rivers which do not form extensive estuaries; (4) no fishes of the family Ariidae have been recorded east of the main New Guinea island.



The type specimens of *Arius armiger* De Vis at the Queensland Museum (L3089, 134 mm SL and L3088, 148 mm SL) on examination proved to be specimens of the common Papuan and northern Australian estuarine catfish *Arius stirlingi* Ogilby 1898, which therefore becomes a junior synonym of *A. armiger* De Vis 1884.

De Vis (1884) states: "To Government agents and captains employed in hiring hands for the plantations, I am indebted for several opportunities of examining fish from the prolific waters around the Islands from which the labour supply is derived. In the collections thus incidentally made . . ." (p. 445). The fishes described in this paper were reportedly collected from New Hebrides, South Seas, "probably South Seas", Duke of York's Group, Bank's Group, Api and New Ireland. It is probable that specimen information on the "incidental collections" made was occasionally confused, hence the type locality of New Britain for *A. armiger*.

Unsuccessful attempts were made to obtain records of the voyages from which De Vis obtained specimens. Even so, it seems likely that the *A. armiger* types were collected on the north Queensland coast or the Papuan coast on an outward or return voyage.

A search was made for the single type specimen of *A. stirlingi* Ogilby, although Roberts (1978) had been unable to trace it in the Queensland and Australian Museums. The specimen is not in the National Museum, Victoria (Gomon, *in litt.*, 1981) and I could not find it in the collection of the Macleay Museum and of the South Australian Museum. Ogilby stated (1898b) that his 270 mm long specimen of *A. stirlingi* was one of a small collection of fishes sent to him by the South Australian Museum authorities from the estuary of the Adelaide River, N.T. There are

two specimens of *A. armiger* in the S.A. Museum from the Adelaide River collected in 1928. One (F.1094) is 221 mm SL, 265 mm TL; the other (F.1095) is 281 mm SL, 359 mm TL.

In 1908, Ogilby proposed a new genus *Nemapteryx*, to accommodate *Arius stirlingi*. However this allocation is not supported by my studies, and I conclude that *A. stirlingi* is a junior synonym of *A. armiger*.

Indicative of the disinterest in these fishes is the fact that *A. armiger* (as *Nemapteryx stirlingi*) was recorded from Papua only 19 years ago (Munro, 1964).

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